Industrial Finishing

Reg. U. S. Pat. Off.

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From the Editor's Desk

INQUIRIES for information on finishing (materials, equipment, supplies, methods, sources of supply, problems) have been particularly numerous recently, with more than half of them referring to articles previously published in INDUSTRIAL FINISHING. While the majority of these inquiries are from finish users, some are from manufacturers of finishes or chemicals who are at work developing new products.

As suggested before on this page, the firm eager to get inquiries and leads to sales will be assured of getting results by carefully watching the subjects of INDUSTRIAL FINISHING editorial and immediately advertising whatever goods are mentioned or featured in the reading columns. June editorial elicited letters asking about the material for use on galvanized metal (page 46) and for wood stains mentioned on pages 22 and 58; while May articles prompted inquiries about non-grain raising stains, automatic dipping machines, plastic wood, and striping tools.

Recent inquiries from other articles include: floating colors, spray booth liner, Mission finish, cleaner for fixtures used in dipping, stencils and transfers, testing instruments, coating for glass, patching tools, and finishes for baseball bats and golf club heads. Occasionally a letter comes in which refers to something that appeared in the reading columns several months back.

Neither hot weather nor vacations prevent alert men from reading about what concerns or what may affect their own particular business, especially when their trade publication is informative, authoritative, and easy to read. Men interested in industrial finishing can profitably read a copy of every issue of INDUSTRIAL FINISHING and then file it away for future reference. Many of the problems submitted by readers are readily answered by referring to what has previously appeared in these editorial columns.

* * *

THERE ARE still business people who are not yet sold on the merchandising value of color. For their benefit a typical experience may be cited illustrating the important part that color is playing in popularizing the use of stepstools, bath stools, and kitchen stools by a firm that is strong for products in color.

A few years ago, when stepstools, kitchen stools, and even bath stools were very slow sellers, an enterprising manufacturer in New York state sized up the situation, realized that these articles lacked color, and soon began to manufacture them—finished in color. He created a fine market for his products almost over night.

The stools made in this plant are finished in four colors—gray, white, green, and blue—which offers something that will fit in with any color scheme for kitchen or bathroom. The stools are made of high-grade steel, electrically welded. This concern is not the first to manufacture stools, but it is the one that gave them the magic touch of color—and that made sales.

Recently this same manufacturer placed on the market a shoe dressing cabinet made of steel and finished in colors. This shoe dressing cabinet made an instant hit with housewives, thus creating a ready market for the product. This cabinet in colors adds a touch of life and beauty to any kitchen or bathroom; it has both utility and decorative value.

K. H. Rohr

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Headquarters
for Spray-Finishing Equipment
for the Finishing Room

DeVilbiss Air and Fluid Hose plays an important part in spray-finishing operations. It is built to provide dependable service and assure long life under rigorous conditions of use. Its flexibility, characteristic of all DeVilbiss hose, prevents undue fatigue to the operator. It is highly resistant to solvents.

DeVilbiss Quality Air and Fluid Hose is made by DeVilbiss in its own factory where skilled workmen and specialized equipment are combined to make hose which adheres rigidly to the same high standard of quality which characterizes all DeVilbiss Spray-finishing Equipment.

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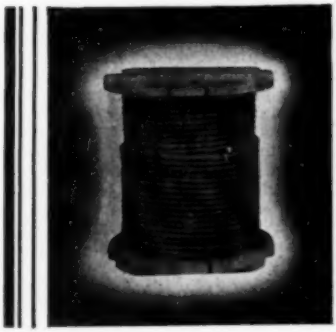
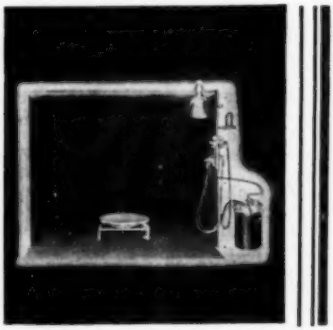
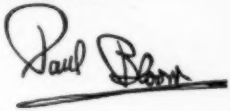




Synthetic Enamels — a Solution

By
*PAUL BLOOM**

"I have had considerable experience in the promotion of synthetic enamel sales, having worked on the sales promotion end of synthetic enamels since its inception some two years ago. Consequently, I have had occasion to comb the available market thoroughly and to consider every possible use for this type of product that seems to me to fill a real need in the finishing field."—



FOR MANY years, manufacturers of some particular products, have been faced with an unusually hard finishing problem. Such products as farm machinery and large implements that could only stand a minimum finishing cost, yet which must look well and stand up fairly well, or such products as kitchen utensils and chemical apparatus, that have to withstand alkalis and acid fumes, present a real problem to the finisher. In the former, of course, the problem is one primarily of production, while in the latter, the problem is one of a suitable material to withstand the unusual conditions presented.

In finishing farm machinery, the problem is primarily one of handling and production. The machines are too large to store economically, and the demand is too seasonal to make them to order, consequently, the finishing system most often in use is to apply one coat of primer and a cheap oil enamel, or just a coat of primer, before the machine is moved to the place of storage. Warehouse space is too expensive for the storing of these large machines, and most manufacturers merely park them in the open or under a huge shed. The machines are subjected to months of outdoor exposure before shipment and the finish necessarily is not in as good condition as it should be.

The usual procedure in filling an order for farm machinery is to take the machine back into the plant, clean it and apply the finishing coats. This is an extremely expensive operation in handling.

* With James B. Day & Co., Chicago.

The finish, of course, is usually a cheap finish that stays on only until a short time after delivery to the customer. In fact, after a machine has been in the fields for only one season, it usually looks as though it had been in use for several years and had been allowed to remain outside during the intervening months.

Durable; Economical

At best, farm machinery does not receive any care that would tend to preserve the finish. Tractors, threshers, harrows, cultivators, sowers, bailers and separators take up a large amount of space; space that the farmer finds to be more useful for storing feed or providing barns for his livestock. The result is that the farmer leaves his machines in the open with only a canvas or wooden roof over them.

Synthetic enamel has done much to solve the finishing problem of such machinery, mainly through the increased durability that it offers. Its durability is comparable to that of the best lacquers on the market, yet the finish is much more economical, not only because of the elimination of undercoats, but also because the finishing material itself has greater coverage.

In the assembly line the machines are completely finished, thereby eliminating the expense of handling a piece of machinery twice—making a real saving—and then allowed to remain outdoors until such a time as they are shipped. A synthetic enamel finish is not as easily broken down as a cheap oil enamel, and even after three months outside, the machines remain looking well and in perfect condition. Then too, since the synthetic enamel is more durable, the finish remains in good condition after several years of service.

Not only has the synthetic enamel proved advantageous from this point of view, but also from another. The old oil enamels, when used on barn equipment, soon broke down under the constant ammonia fumes of the barn. Synthetic enamel, however, is impervious to these fumes and will not break down from them even when the fumes are strongest. In fact, when testing for this particular point, synthetic enamel finish has not broken down under the direct exposure of ammonia—a test in which both lacquers and oil enamels broke down completely. The old type oil enamel or colored varnish turned a grayish cast when subjected to the fumes, and when ammonia was applied direct, the finish pulled away from the metal entirely.

White Doesn't Yellow

Tests of this nature naturally led to another set of tests designed to find just what properties for chemical resistance could be expected from this material. Manufacturers of chemical apparatus are faced with a real problem. Their finish must be white and must retain its whiteness under washing with strong soap and under the chemical fumes found in laboratories. In ordinary usage a white finish yellows easily, but under exposure to fumes and heat, such as found in laboratories, it is even harder to retain the clean whiteness that is necessary.

Synthetic enamel, however, because of its ability to withstand the abnormal conditions to which it is subjected, is ideally suited as a finish. While they will not, of course, stand the direct application of any of the more powerful acids, they will retain their

gloss and color under exposure to the fumes exuding from them.

Withstands Heat

Another feature of synthetic enamel, and one that is extremely important, is its ability to withstand a high degree of heat. Where lacquer will crack and craze under even comparatively low degrees of heat, the synthetic finish will retain its color and gloss. This feature has made it an ideal product for use on kitchen ranges; not of course, as a complete finish, but as a finish for the legs and the parts that do not come in direct contact with the maximum heating of the range. The high gloss that is obtainable makes it well matched to the porcelain parts of the stove, yet it has the advantage of being more economical from both the standpoint of finishing operation and material.

Because of this factor, it may also be used very successfully as a finish for percolator handles, lighting fixtures, kitchen utensils, and as a finish for handles on electrical apparatus such as irons and toasters. In fact, anything that does not develop such a high heat as to burn off a finish but high enough to crack it and change its color should be finished with synthetic enamel.

Covers Metal, No Priming

The resin used in synthetic enamel also makes it unusually adhesive to metal. It will cover metal in one coat satisfactorily without the necessity of priming. The only precaution that need be taken is the usual one of cleaning the metal thoroughly. This feature makes it especially adaptable for use in finishing metal novelties that usually require the best finish obtainable for the money. Most novelties such as toys, hooks, etc. get quite a bit of wear, and the usual oil enamels soon break down; lacquer is often out of the question because of price and because it does not usually adhere to metal without an oil undercoat.

On the whole, I can safely say that synthetic enamel is here to stay and that it is solving the problems of many finishers who formerly desired to produce a durable finish, yet one that was economical from both the standpoint of cost of material and application.

As compared with lacquer, I find that synthetic enamel is far more satisfactory for many types of finish. In production, where drying time is an important factor, it dries much faster than oil-type enamels—in this, comparison being very similar to lacquer. As for covering power, we can make actual physical comparisons; a lacquer finish retains about 15% of the wet coat when dried, while the synthetic retains between 40% to 50%, consequently, the unique high covering power, coupled with the relatively fast-drying properties and good durability, are making synthetic enamel one of the most important finishes on the market.

DeVilbiss St. Louis and New York Branches Move

The DeVilbiss Co., Toledo, Ohio, announces that its St. Louis Sales and Service branch has moved from 1903 Washington Ave., to 1937 Washington Ave., St. Louis, Mo.; and the New York Sales and Service branch has moved from 25 W. 43rd St., to 25 W. 45th St., New York City.

Zapon's New England Sales Headquarters Moves

Headquarters of the New England Sales Division of the Zapon Co. has been moved from New Haven, Conn., to Stamford, Conn., to better facilitate deliveries and more efficient service. Mr. Oberender will continue in charge.

Furniture Show Finishes

By
R. C. MEADE

Returning to favor: period designs; oak, maple and mahogany; refinement in finishes; more exposed wood on living room pieces. Moderne design and color effects appear in porch and sun room furniture

WHILE STROLLING the halls of the Chicago Furniture Mart in the first week of June, 1931, I was reminded of a booklet gotten out by a leading wood finish manufacturer along about 1912 entitled "Period Finishes" a valuable illustrated brochure which set forth in considerable detail the exact shade of stain and filler and type of protective finish (shellac, wax or varnish) suitable to the various standard periods from Gothic to Mission.

Following the war, the demand for this once popular and practical booklet vanished in the face of a general pursuit of novelty. It is perhaps beside the point that nothing of significance came out of the late Jazz decade except for Moderne, but it is a fact that the manufacturer above mentioned might well republish his brochure "Period Finishes."

Pure period design is returning, and with it an inevitable standardization of finishes. The nearest to being a newcomer is French Provincial, well supported however by the veteran Gothic and always popular Early American designs. By the same token walnut in the field of woods continues to lose popularity to oak, maple, and mahogany.

Woods and Periods

Maple naturally finds its largest following in Early American designs, closely followed by French Provincial. The color for the former is a light honey, the veneer either birdseye or curly and the finish generally a polished one in varnish rather than lacquer. There is no shading or other common form of decoration.

Maple for French Provincial to some extent divides honors with beech and birch, but in all cases it is stained a much deeper tone with a pronounced accent on the antique effect through shading or high-lighting, along with a dull flat lacquer finish. There is conventional use of flat carving and scroll recessed panels characteristic of the period.

Mahogany, as at the last market, is now staple in practically all spaces showing American Empire or Duncan Phyffe designs—and this means practically all. The color is a rich tone of brownish red, giving the straight fiddleback or crotch veneer every opportunity to please the eye with changing angle of vision. The finish ranges from a high sheen of rubbed effect to an "out-and-out" piano polish.

Oak, after an apparent reaction from too much pushing, is again to the fore in Gothic, Tudor, Elizabethan and Jacobean designs. Though often shown in combination with walnut it is not denied that oak has achieved a definite revival as part of the period trend.

The stain color, applied by wiping, is an antique highlighted deep brown. Carving is profuse, heavy with authentic motifs such as medallions, thistle and rose, heraldic devices, etc.

Walnut continues a valiant if losing contender in the cheaper lines where it appears in blends of butt and burl, pencil stripe and gum wood. Shading too has disappeared with the tendency to eliminate fancy overlays, sunburst effects, etc., which required harmonizing. The type of design is nondescript, the finish is a straight medium brown, either dull rubbed or polished as to sheen.

Bedroom Furniture

Mahogany and maple have the call in Colonial four posters and spool beds. Widely seen as alternatives are at least one suite of a maple French Provincial, and frequently an Elizabethan oak design. Sleigh and gondola beds are featured in mahogany, and an exceptional number showed a Louis XV or Regency design with walnut posts and Aspen crotch veneers of unusual beauty.

Enamel furniture lacks demand, due, it is said, to a flood of garish colorings a few years back. When seen, the better grades favor ivory and pale green, sulphur yellow and light blue. Metal beds are finished in light and dark two-toned walnut grain, curly maple grain trimmed with green, and in color combinations of which aluminum, green and black would be an example.

Dining Room Furniture

Oak and mahogany dominate this field, the former in the Renaissance English designs previously referred to. The melon bulb leg, much carving and great emphasis on the worn, antique effect likewise characterize the former. Mahogany appears in Duncan Phyffe and occasionally Queen Anne.

An excellent example of French Provincial cabinet in maple finished in water stain and flat lacquer.

In the dinette field maple is popular for French Provincial and Cape Cod suites, the latter with triangular corner cabinets and Welsh servers, all in rather deeper colors and duller sheen than hitherto seen on these designs. Hitherto a light amber color and a high rubbed effect have been preferred. A novelty in dinettes was an Italian Renaissance suite in gray walnut with polychrome decoration such as had not been seen since 1920 or thereabouts.

Living Room and Novelty

Novelty in this field is seen in design rather than finish, although

it probably gladdens the heart of the wood manufacturer to observe a greater use of exposed wood frame than has been the case for some years. Such frames show considerable carving in oak and walnut; less so with mahogany and maple.

Maple suites are featured in Colonial designs, a novelty shown was a chair, Egyptian in design, with "Couchant" lions in natural forms for the sides, the tails constituting the arms. The finish was black with polychrome in the carved details.

Perhaps this is symptomatic of the new school of interior decoration which approves for the living room a combination of pieces, as for example a Queen Anne tilt top table, a Hepplewhite chair, a Louis XVI sofa, a Regency foot-stool, a Chippendale chair and a Duncan Phyffe table.

Porch and Sun Room

The Deauville chair (tubular tilting) vies with fiber and stick reed to maintain the popularity of Moderne design in at least one field. The color schemes feature blue together with greens, reds and yellows. Chromium plating is staple in the former along with black or red; in the fiber-reed suites green, tan and blue in two-tone and three-tone effects predominate. There is also some shading, largely brown or natural.

Breakfast Room; Kitchen Cabinets

Breakfast room furniture features natural finish backgrounds with colorful and often fantastic border designs, executed either by decalcomania or silk screen stencil. Natural finishes are also shaded in brown, ivory with tan, or blue and gray with blue, either in an all lacquer finish or clear gloss lacquer over stain and filler.

Wood kitchen cabinets are finished in ivory and green two-tone effect almost as a standard color scheme. A novelty was seen in lemon yellow and gray with red stencil decoration, and very effective it appeared. Refrigerators have reacted from color and have returned to white with occasional green trim.

Every new development in finishing materials helps to provide the manufacturer of some article with a new and better finish.

Colors Popular for Automobiles

Black has climaxed ten months of leadership in the automobile color field with a new peak, according to the June issue of the "Automobile Color Index," published monthly by the Duco Color Advisory Service. The demand for bright colored wire wheels and door saddles upon otherwise black cars may indicate that the public is preparing to champion gayly colored motor cars soon again. At any rate this increasing use of color as an accent upon black cars is a trend worth watching.

Blue is advancing once again. This is the sixth consecutive month of leadership for deep effulgent serge blue and bright, limpid boatswain blue. Commander, a light clear, rich median blue with a slight reddish undertone, and Niagara, a dark, rich conservative greenish hue of blue are the only two style colors to become fashion in this hue since last month.

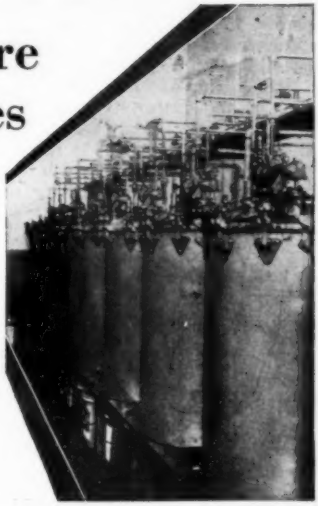
Green has declined to a new low position. The green color family is noticeably lacking in outstanding individual leaders.

The demand for maroon has increased somewhat of late at the expense of brown. Royal, a deep, purple maroon, and state, a rich red maroon, have gained prominence this month.

Interest in brown appears to have declined somewhat for the present. The new range of mellow, rich, opale browns—such as Worth, Clio, and Enigme—provides a series of modish style colors that have been developed to make satisfactory replacement values for the drab brown variations. Thorne brown has excelled all other brown values in length of fashion appeal.

Gray is still advancing in importance. Granite gray, a dark, rich, value, is the only new gray to appear in this month's report.

Central Pressure System Supplies Spray Booths



By
J. W. EVANS

Factory Manager of Graham Paige Body Corp., Evansville, Ind., describes and illustrates the central pressure-feed system of supplying finishing materials to spray booths, explains its advantages, and tells how it is operated and maintained

MOST OF THE improvements in industrial machines are designed to reduce labor and increase production. To remain in business and make a profit, the manufacturer is forced to avail himself of this equipment. It is essential to present day operation. But reduction of labor and increase of production is not the whole story. It is my opinion that conservation of materials will occupy the best minds of industry more in the next ten years than it has in all of the years that have passed.

To this end, I have selected the central pressure-feed system and its appurtenances for discussion. Outside the safety factor afforded through the use of this system, it reduces waste of finishing materials, centralizes storage, mixing and the source of distribution, which promotes control and uniformity. It saves time and labor and makes for smooth, continuous operation.

Our system comprises twelve 60-gallon pressure tanks, with a 15-gallon reserve tank for each 60-gallon tank and the necessary piping from the tanks to 14 widely scattered spray booths located along the conveyor lines. The tank room also contains 12 mixing barrels equipped with air-operated agitators. Eight pressure tanks are used for colored lacquers, and there is one tank each for clear lacquer, lacquer reducer, surfacer, and primer.

I believe the most comprehensive description of the system may be had through a detailed account of how it is used. Of course I need not remind you that the storage and tank room must be kept scrupulously clean. White walls and ceilings, and a smooth concrete floor facilitate cleanliness. All finishing materials are

retained in drums equipped with spigots, in the storage room.

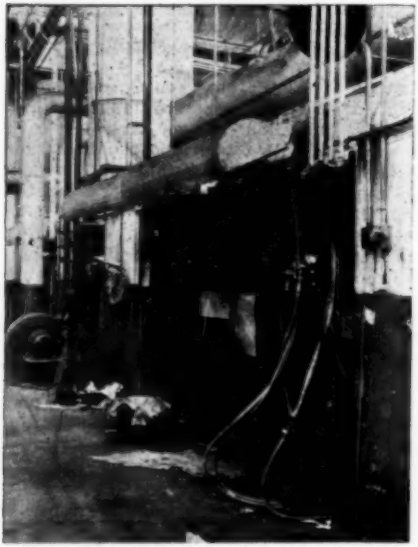
Each pressure tank has six petcocks lined up vertically by means of which the operator tests the level of the material inside the tank. An hour or so before the tank is empty, lacquer is drawn from the drum, mixed with reducer until a specific gravity of 20 to 26 (generally 23 for colored lacquers) is reached. Then it is poured through a fine wire strainer into the mixing barrel, to be agitated until needed.

The 15-gallon reserve tank is ahead of the 60-gallon pressure tank in the system. To fill the pressure tank, it is cut out of service and lacquer is fed into the line from the reserve tank so that no break in operation occurs. The air motor that operates the agitator on the pressure tank is stopped and the pre-mixed lacquer is poured in. After the plug, which practically seals the pressure tank is inserted, the agitator is started and the tank is again cut into service.

All of the containers, mixing barrels and tanks are practically air tight. This retards evaporation and discoloration of pigmented lacquers until it is a negligible quantity. Two men do all of the mixing and control the air pressure on all lines, from the central station. This makes for uniformity, reduction of waste and continuous operation.

Under ordinary full time operation, the lacquer lines require little attention, and no cleaning. Should the plant be closed down for a day (for instance over Sunday) before starting work again, the system operators remove the spray guns from the lacquer lines at the most remote points of distribution from the tank room and drain about ten gallons of lacquer from the pipes. This lacquer is poured back in the pressure tanks and agitated before it is used. This assures absolute uniformity of color in pigmented lacquers. Primer and surfacer lines are cleaned each night after the plant stops work, to prevent clogging of the lines through settlement of the heavy pigment in these materials.

The method of cleaning the system follows. All of the finishing material is drained from the reserve tank into the



Notice the four material supply lines (vertical white lines in upper right) through which material is delivered from the central pressure tanks.

pressure tank by attaching a hose to the connection at the bottom of this tank and forcing the material back by air pressure. Then the reserve tank is filled with lacquer reducer for the pyroxylin lines and turpentine for the primer and surfacer lines. The solvent is then forced through the system, with the spray guns removed, and caught in a container. As the stream of solvent runs clear, spray guns are attached and cleaned. The solvent is returned to the storage room to be mixed with the finishing materials.

The air motors which operate the agitators are equipped with alemite fittings, and when running steadily they are oiled twice a day. We operate from one to six spray guns on each line with satisfactory results. Air pressure from 20 to 30-lbs. per square inch is carried on the pressure tanks with 90-lbs. air pressure on the spray guns.

The salient points of this system are, (1) reduction of fire hazard through storage, handling and mixing of combustible materials in a fireproof room removed from the rest of the plant, (2) elimination of manual labor and delays in delivering finishing materials to widely scattered spray booths located at strategic points on the conveyor lines, (3) the ability to absolutely control the supply, mixing of materials, air pressure, and color in pigmented lacquers, (4) assurance of clean uniform materials at all times, delivered to the spray guns thoroughly mixed and at the correct temperature for application, regardless of the time of day or outside weather conditions.

Checked or Cracked Finishes; Cause and Remedy

By
*R. J. FAIRBURN**

What causes hair lining, crazing, checking and alligatoring in varnish and lacquer finishes, how to avoid these troubles and what treatment will cause the finish to knit together "good as new"

SOMETIMES a varnished or lacquered surface will develop a series of interlacing cracks. This is particularly true on wood, but is also found on metal or fiber. When these lines are deep and the surface is very rough, the condition is known as "alligatoring." Moderate cracking is called "checking," and the finer lines are generally designated as "hair lining" or "crazing." Regardless of the severity of cracking, the causes are similar.

This condition is usually caused by a hard drying material being applied over a more elastic one. A temperature change causes the wood or metal to expand or contract; the undercoat moves accordingly and the less elastic top coat cracks. It may also occur

*Sales Promotion Manager, Brevolite Lacquer Co., North Chicago, Ill.

on green or very moist wood, when the wood dries and contracts. Cracking also might be caused by a warm finishing material being applied on a cold surface, or vice versa.

The top coats should approximate the undercoats in elasticity. If shellac is used as an undercoat, a fairly light film should be applied, as a heavy film may become brittle and crack. It would seem unnecessary to say that a permanently good finish probably will not be possible on wood that has not been properly seasoned and dried, yet it is surprising the number of times this is attempted. Any moisture in the wood at the time it is finished, is bound to escape sooner or later. In escaping, it will probably push through the finish, or the wood will contract enough to distort the finish.

For best results, the finishing material should be stored in a warm room. If this is not convenient, it should at least be brought into the finishing room the night before it is to be used. In this way it will gradually come to room temperature before being used. Varnish, in particular, should be applied in a room in which the temperature is not less than 70° F. or warmer. The temperature should not fluctuate; temperature changes will cause the wood or metal to expand and contract, and probably cause the finish to crack. Cold drafts must also be avoided. The finished work should not be moved to a colder room until the finish is dry.

It is so difficult to repair a finish that has cracked that usually it is preferable to entirely remove the old finish in which case the surfaces will usually need to be restained—or at least the old stain will have to be re-toned. Finishing operations may then proceed in their regular sequence.

Sometimes it is practicable to repair checking or crazing that is not too severe. There are several crack removers on the market—some of which are often advertised in this magazine—that are satisfactory for varnished surfaces. These removers soften the surface sufficiently to permit the varnish to knit together, thereby removing the cracks.

For lacquer, a light coat of the lacquer thinner may be applied. This will permit the surface to re-knit, and a light sanding operation will then further obliterate the cracks. A coat of clear lacquer that has been liberally reduced may then be applied. This coat will dry quickly without biting into previous coats. The cracks might still show but should be drawn together and disappear as the lacquer dries. One to three more coats of lacquer, unreduced, should follow.

Berry Bros.' President Honored

Mr. W. R. Carnegie, president and General Manager of Berry Brothers, Inc., Detroit, Mich., has been appointed to the directorate of the Detroit Board of Commerce and also elected a director of the Union League of Michigan.

Finishing Book for Executives

A tremendous amount of practical information on wood finishing materials of every kind—describing their characteristics and revealing many valuable suggestions for their application under modern shop methods—is conveniently arranged for immediate reference and rapid reading in a new book just published by The Gilbert Spruance Co., Richmond and Tioga Sts., Philadelphia, Pa. It contains nine sections, 125 pages 5 x7¾-in. This edition is limited but while they last, copies will be sent free to executives who forward their requests on company stationery.

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General Office: Koppers Building
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No Branch Factories

Decorating a Bus with Animal Pictures

By
JESS G. ROE

Foreman finisher of Coca-Cola Bottling Co., Kansas City, Mo., explains how he did an interesting bit of nature-study painting and decorating on the sides of a bus for taking children to outings

WHEN THE company here decided to take children within a radius of 50 miles of Kansas City for outings in connection with their nature study courses, they turned over to me a White bus to be decorated to suit their purpose.

In doing this I was expected to use the trade colors of chrome yellow and vermilion red as foundation colors; to create a background interesting and educational for children; to decorate the interior of the bus suitably and beautifully; to portray animals in true-to-life colors and poses, and to have the bus ready for use in three weeks.

I had as models for the animal pictures the excellent nature study cards the company uses in its nature work with children, but I found it necessary to add some others because it was decided to omit the ordinary domestic animals and substitute some others not so well known.

We found there would be space on the outside for 34 animals, and I found authentic pictures of the ones needed in the public library, searching the dictionary and encyclopedias until I found what I wanted.

After the finish was removed from the body of the bus, the metal was neutralized, an oil-base primer applied and it was oil serviced and sanded to a plate-glass finish.

Chrome yellow medium was applied to the exterior excepting some of the panels—for instance, the center panel is vermilion red lettered in white; the yellow panel is lettered in red; the green panel in white.

I outlined the animal pictures, free hand, in charcoal and protected the outline by a coat of masking cream applied outside the

outline. Then the colors were shot in. This leaves a picture that is sharp and clear and is much more durable than if brushed in on the surface.

By very careful manipulation of the touch-up gun a more even blending of the colors is possible than by any other method. I used an assortment of 12 cups, but many more than that many colors and color combinations.

Of course there were some touches I had to do by hand; the bear's nose for instance and the eyes of the animals and birds and the possum's long hairs that are thinly scattered and coarser and longer than its fur. Strange to say a dark animal requires much more care to picture in realistic colors than a bright colored bird.

Now there is the seal; it has a sheen as uncertain and satiny as changeable silk, and it takes a lot of colors, delicately blended, to produce the effect wanted. Then there is the buffalo; some folks think he is just brown, but in different lights he shows up many shades. I think I am not exaggerating when I say I used as many as 100 colors on the buffalo.

The interior of the bus is paneled in squares and lacquered in lettuce green with a ½-in. border of antique gold very delicately blended into the green. In each corner is a conventionalized bluebird.

The whole exterior is finished with polishing wax.

Funnel Stopper Useful

This is a rather homely little idea for the finishing department of a factory, yet we have adopted it to a rather good advantage on the various size funnels we use in handling our liquids.

It requires but little skill and patience to make the stoppers and rods and to attach them to the edge of each funnel handle; then when one is filling a blind container, such as a gallon can, etc.,

Saves many wasteful overflows.

it becomes a simple matter to plug the funnel quickly when the container fills unexpectedly before the funnel is empty. The messy wasteful overflow is saved and can be returned by way of the funnel to its original source.

Yes, I know that an operator should not pour too much into a funnel when filling a container—then you would not need this—but experience teaches that we all do it, and it's extremely convenient to be able to plug the funnel and save the mess.—C.H.W.

Scientific air conditioning involves the control and utilization of air as the medium most directly important to the health, comfort and efficiency of the human being and to the most successful operation of manufacturing processes.

Display Table Tops Warped; a Finish Problem

By
E. F. WERNER

Superintendent of American Fixture & Showcase Co., tells how certain customer complaints led to the investigation and satisfactory solution of a puzzling problem wherein kiln drying and finishing were especially concerned

WE MANUFACTURE a competition line of display tables in the usual assortment of lengths and widths. In addition to the plain top table some are sold with rub rails and glass dividers so that the table can be used for miscellaneous display purposes in the aisles of the various department stores and other retail stores.

A large number of the tables had been sold without any comments whatsoever. The goods represented value for the money, and we felt that we were giving the trade something that it could use to good advantage, and at the same time provide us with "leaders" in certain territories. The margin of profit was small, but it had become necessary for us to sell certain items to fill in our line even if the usual profits were not available.

A complaint came to our attention that a table equipped with rub rail and glass dividers was warped and an allowance requested. Rather than have the cost of bringing the table back we gave the allowance. A short time later another complaint came in. That meant that something drastic would have to be done because it was apparent that it was not the fault-finding of a super-critical buyer, but something was fundamentally wrong in our merchandise.

The first thing mentioned was "wet lumber." That has been the battle cry as long as I can remember; when in doubt, blame the lumber. True, this is the cause in many instances, but it is not always so. At any rate judgment should be withheld until some investigation can take place. We were buying our table stock in the form of dimension, and a very careful check showed that the lumber was dry and in good condition.

Complaints are never very welcome, but if they bring out faults that can be rectified or help improve the merchandise then they have fulfilled a worth while part in the production scheme. But the complaints that seem unexplainable are soul racking and make it hard for the production department to answer the office's question, "Why did it happen?"

A number of the tables were on hand "in the white" and a careful check showed that one or two were not perfectly true, but this could easily happen without any serious complaint. These tables were watched after

Here's where you save some real money . . .

and get a better job at the same time

Saving real money is interesting to everybody, and saving money *plus* getting a better job is still more interesting.

Consider carefully these characteristics of Murphy Permanent Stain in connection with your own work:

No grain raising or subsequent sanding.
Clocklike regulation of filler application.
Immediate "automatic blending."
Instantaneous "high-lighting."
Rapid "matching-in" of variable wood.
Deep and rapid penetration without bleeding.
Absolute fastness to light.

And now consider this most impressive and convincing testimonial to the economy and efficiency of Murphy Permanent Stain.

One of the biggest cabinet users in the United States let out his enormous cabinet contracts in 1930 to concerns at strategic shipping locations in 13 states. His inspection and specifications are plain "tough" — and although his stain specification reads "optional — either Water or Permanent Stain" — every cabinet maker eventually chose Murphy Permanent Stain, and is now using it.

Such a unanimous practical production acceptance certainly invites *your* investigation. If you wish a demonstration or additional information write us.

Murphy Varnish Company
Newark Chicago San Francisco

ESSEX VARNISH COMPANY, Newark
(Associate Company)
Baking Material Specialists

Murphy Permanent Stain is licensed by the Chadeloid Chemical Company

Murphy Permanent Stain

they left the finishing room, and several warped to such an extent that a complaint could easily be made if they were used in connection with the rub rail and glass dividers.

One of the men in the finishing room—a man who had been in the game for a long time—declared that the table top warped because one side was finished and the other was not. He stated that several years previously he had worked in a high grade cabinet shop and after many attempts to prevent trouble on their important jobs, they had been compelled to finish both sides of the work to prevent warping and twisting.

The explanation sounded reasonable, and we undertook to make a thorough check to see if that was the reason for the trouble and if we could rectify the situation without too great an expense. When the margin of profit is small, care must be taken that extra cost is not added that will throw the account into the loss column instead of the profit column.

A Test Run

A lot of 200 tables were run through the plant. After they were assembled (insofar as the top is concerned, the legs being shipped separate) each table was checked to make certain that none of them were warped to any great extent. Those that showed signs of being somewhat out of a straight plane were divided into two groups, as were the remainder of the lot, and equal lots of 100 were sent to the finishing room.

The first lot was finished in the same manner that all previous lots had been—namely, filled, given a coat of shellac and a coat of varnish, then waxed and rubbed. The table being a medium priced one, we felt that we could not afford any further finishing costs. The other lot was finished in the same way, but in addition, a heavy coat of shellac was applied on the under side.

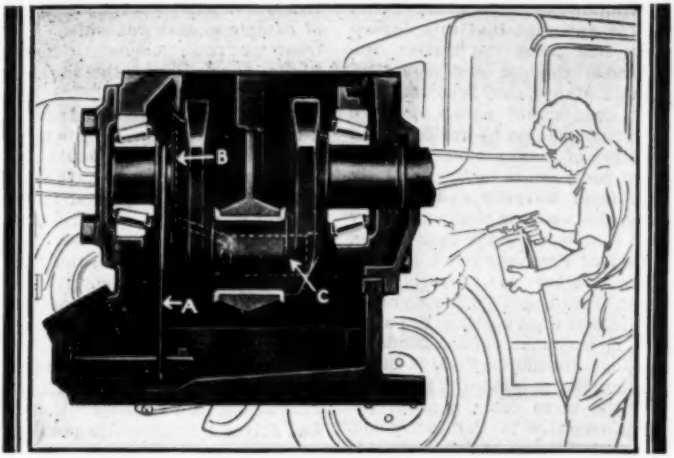
A check of the results showed that in the lot wherein the tops were not finished on the under side, several tables could not be used with rub rails and glass dividers. The lot wherein the tops were finished on the under side also, contained no tables that would have to be thrown out completely. Several of the tables were slightly warped, but not to the extent of being useless.

The cost of applying the extra coat of shellac on the bottom sides of the table tops cut into the profits, which were small enough already, but the production department felt that it was better to do this than to stand the cost of replacing defective merchandise or of making allowances.

The heads of the company were inclined to be skeptical regarding the "cure" adopted. They felt that if the proper precautions were taken in the purchase of materials that were absolutely kiln dried, and if the tables were assembled properly, the troubles mentioned would not occur.

The matter was dropped for a time with the statement that the company would rather have the cost than the complaint. The writer felt that if additional evidence could be obtained regarding the matter it would have material weight with those higher up in the management. With this thought in mind, a letter was sent to the Forest Products Laboratory, conducted by the U. S. Dept. of Agriculture at Madison, Wisc., in connection with the University of Wisconsin.

Several bulletins and technical notes were received, all of them



NO OIL SPOILED JOBS

Centro-ring Oiling Keeps Excess Oil Out of the Supply Line

Curtis Compressors provide the surest safeguard against oil in the supply-line by two patented exclusive features of design.

1. The Curtis centro-ring oiling system (Pat. Pending) delivers the exact amount of oil needed to working parts. A ring (A) lifts oil to under-cut groove (B) in crankshaft. Centrifugal force carries it through ducts through chamber (C) in crankshaft. Then centrifugal force re-distributes it to ribs in the crankshaft, which lead the oil to each friction point to definitely control volume. No excess to get in the discharge line.

2. The Curtis suction valve type unloader avoids oil pumping due to vacuum. It operates on the suction valve so that when the machine is unloaded, the valves do not operate as with the suction port unloader.

Mail coupon for catalog describing these vital features and the many sizes of Curtis Timken Bearing Equipped Compressors for Paint Spraying, in both stationary and portable types.

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P-1

bearing on the subject in question. It was apparent that this department had given the matter considerable thought and attention.

In substance, they recommended that coatings of equal moisture resistance should be applied to all surfaces of wood products if these wood parts are to be kept entirely free from warping and twisting when the weather changes. They said that tests, made over a long period of time, showed that even when lumber is properly kiln dried, it will pick up moisture regardless of what coatings are used.

It is true that certain kinds of coatings are more effective in excluding the entrance of moisture, and the more coats applied, the more effective is the protection. Unequal coatings on opposite sides of a wood surface are the cause of unequal rates of change in the moisture content of that wood, so while the twisting and warping will not be as severe as if no coating were applied on the reverse side, it will still take place.

The Laboratory went on further to say that although it had found shellac, varnish and other high-grade moisture-resistant finishes satisfactory in decreasing the rate of change in wood, it had also examined other moisture-resistant materials. These materials, easily applied, were inexpensive and gave a resistance on the back equal to that obtained by the higher-priced materials on the face. Information regarding these materials may be obtained from the Laboratory.

One of the excellent bulletins received from the Laboratory is entitled, "Shrinkage of Interior Trim; Its Cause and Prevention," by L. V. Teesdale. The information given in this pamphlet concerns the installation of interior trim in new buildings and the troubles encountered on account of dampness and wet walls. The treatment recommended is similar to that advocated for the handling of furniture.

The information received served a twofold purpose. It convinced me that the step we had taken was the best one under the circumstances, and it proved to the officers of our company that even though we did have the best kiln dried lumber possible in the form of uniform dimension, it was necessary to finish the merchandise properly to get the utmost value.

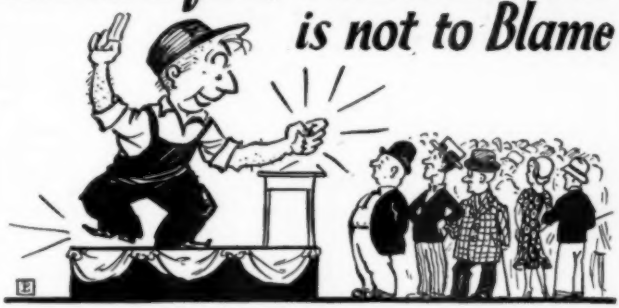
Needless to say, the finishing department felt rather elated upon convincing the "bosses" that it had solved a troublesome problem.

Finishing Costs; Materials and Supplies

As with almost any other cost finding, the compiling of finishing costs is a matter of collecting the time and material consumed, and adding to it an accurate amount for overhead or other charges, so that a true cost is finally arrived at. Why some factories that are much the same and which manufacture identical products can have such wide differences in the cost of their products depends upon various causes. One of these causes may be due to inaccuracies in the collection of the amounts of materials used on a job.

In order that our method of collecting this information be as nearly accurate as possible, we recently made some innovations in our plant in the way in which this matter is handled. Our main trouble in the past was that the amount of practically every finishing material (and supplies) used on a job was arrived at by guess-

The Lacquer Manufacturer is not to Blame



Lac says:—"The lacquer manufacturer is not to blame for inferior lacquer finishes. He is forced to meet the price specifications set by many of the automobile manufacturers. Therefore the quality must suffer."

In reality it is the automobile manufacturer himself who should assume the blame for the increasing number of lacquer finishes that crack, peel and fade in a few short months.

In his attempt to reduce production costs he will buy lacquer on price—forgetful of quality, although inferior quality is more expensive in the long run.

PENTASOL AND PENT-ACETATE

properly formulated, are invaluable aids in the production of high quality lacquers at reasonable prices. Lacquers that have a fine gloss and high resistance to climatic changes.

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The SHARPLES SOLVENTS *Corp.*
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work. We took a handful of rags and estimated it to be a pound; weighing took time and was out of the question. We kept our spray gun going intermittently for 15 minutes and guessed we had used about a quart of lacquer. A series of guesses was the order all the way through.

Then we commenced making changes. Wherever practicable we stored material in unit containers. With our standard stains a man could get a gallon can full of stain and know whether he used a gallon on any particular part of it. We put marking ridges on our gravity lacquer buckets so that an operator could examine the mark at the beginning of the run and at the end and learn the amount of material used between. Our sandpaper was cut into quarters of a sheet and requisitioned as needed. All of our wiping rags were (for a slight additional cost) purchased in 1-lb. bundles. The purchase and use of these unit bundles made it easy to find out the exact amount used—and it also proved cheaper in the long run as the workmen now take a bundle and use it all up before getting more, instead of picking out only the large pieces from the big bales and leaving the stringy pieces to accumulate. The stringy pieces are difficult to use and really are almost valueless.

These changes caused very little trouble, and now we have the assurance that the "materials and supplies" part of our finishing costs is correct.—M. M.

Clogged Silk Screen Stencils

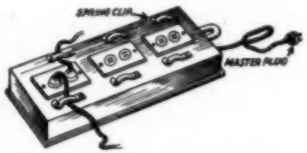
Paint materials used in making signs and designs where the silk screen stencil process is used must be capable of passing through the screen without sticking and clogging the mesh. This includes properly ground material, and also that which has a tendency to harden while in the meshes of the silk.

To correct this trouble the silk screen should be frequently washed on both sides with benzene to which a little kerosene has been added. It may be possible to improve the defective material with a little varnish. However, it is usually better to discard and not use it at all rather than allow it to spoil the work and consequently cause the labor to be lost.

I might mention too that sometimes trouble in this popular decorative method is caused by the use of a squeegee having an uneven edge, since the whole success of the process depends upon uniformly forcing the paint through the silk screen.—J. M. W.

Multiple Plug Board

In these days of many electric hand tools such as body sanders, buffers, spray outfits, portable



Receives plugs from several extension cords

paint remover tools, etc., it is often desirable to use 4 or 5 plug outlets from one point. There are many types of combination plugs or attachments for the light socket, but they are not all suitable for industrial work for too many plugs hanging onto such an attachment abuse it and they are always pulling apart when one

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DU-PROS PURE SHELLAC

Like all other commodities, shellac has declined in price. But shellac has gone farther than most. You can now buy Du-Pros Strictly Pure Shellac at the lowest price of the twentieth century. Du-Pros is now the most economical finishing material of all.

Consider the unequaled film-building properties of pure shellac. Consider its dependable quick drying and easy sanding. Because of its familiar quality and the extraordinary low price now quoted, Du-Pros Pure Shellac should be part of every finish.

The return of better business conditions will automatically increase demand and prices. Your shellac requirements for the next few months should be taken care of at once. Write or wire for quotations. Cover now and profit later.

JAMES B. DAY & CO.

Lacquer, Stain, Filler, Sealer, Enamel

CHICAGO

moves about with the portable tools.

The accompanying sketch conveys an idea of an outfit that we have concocted and which we use to very good purpose. We call it a "multiple-outlet" or "plug board." Any shop maintenance man, with the regular commercial base board outlets, can soon make up this type of board. We use spring clips on each side, as shown, to prevent the accidental pulling out of the individual plugs. A further value not shown is a fuse block set in the back of the board so that one can replace a blown fuse at the job. Of course the value of the fuse in the block is apparent in that if one shorts a tool, the fuse blows in the block; it does not disrupt any other service in the shop.—C. H. Willey.

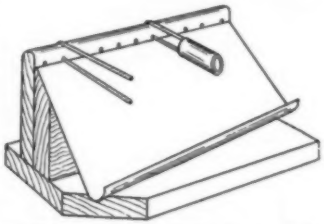
Wood Stains

Wood stains are available in four classes: those soluble in oil; those soluble in alcohol; those soluble in water, and those soluble in both alcohol and water. Examples of those soluble in oil are rose aniline and oil yellow. Spirit blue, malachite green, and aurene are included in the alcohol-soluble group, while brilliant blue, methyl orange and fast red are contained in the water-soluble group. In the alcohol and water-soluble classification may be found Bismark brown, malachite green, violet and magenta.—J. M. W.

Handy Spray Stands

In the process of handling many and varied types of small metal parts for dipping or spraying, we find that the small-parts drying stands, such as shown in the sketch, are valuable aids—cheap but efficient.

We cater to the individual customer and find that one wants 100 pieces green, another 25 pieces red, etc., and as we put through many such small orders in the



Small tongs hold the parts above a drain trough.

course of a day's production we have many of these small stands. Each stand consists of a base and a supported trough of zinc. The back board is drilled for the spring tongs which are made of round brass rods about 3/16-in. in diameter. The use of these tongs is shown in the sketch; they can be opened more or less as needed to suit the work.—W. H. C.

Diacetone Alcohol

This colorless, slightly odorous solvent having a slow evaporation rate is used in brushing lacquers to delay their drying. Also, it has useful non-blushing properties.—W. M. J.

Sherwin-Williams Kem Finishes

The Sherwin-Williams Co., Cleveland, Ohio, has ready for distribution its booklet about "What the world's greatest paint scientists say about the new chemically evolved 'Kem-finishes'" which is Sherwin-Williams' new line of baking, air-drying and exterior enamels made from Kem gum, a chemically evolved material that embodies the advantages of natural fossil gums without their disadvantages. This new illustrated booklet is 6x9-in. in size and contains 29 pages.

AT LAST!

The Ideal Sealing Undercoat for Varnish

9016
SYNTHO SEALER

Dries in an hour. Sands without gumming or excessive dusting. Requires less sanding and lays smoother. Gives perfect anchorage and adhesion for Varnish. Holds out Varnish coats as well as any known type of Sealer. Lessens tendency of checking and cracking.

Made to give

100%
SEALING EFFICIENCY

on endwood, turnings and soft, sappy lumber.

Try it and be convinced. A five gallon sample for trial can be had at drum price. Send in your order today.

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New Materials and Equipment

Presenting briefly, certain outstanding features of new or improved materials, supplies and equipment which have been developed and made available for use in modern industrial finishing departments

New Bleaching Sealer

The V. J. Dolan & Co., Inc., 1830 N. Laramie Ave., Chicago, Ill., announces its new bleaching sealer, which is a non-grain-raising wash coat sealer for turnings, end woods or overlays where a light or uniform finish is desired, or where pigmented stains or fillers are to be applied over soft woods. The properties of this material are similar to any bleaching lacquer except that solvents have been used which permit brushing, spraying or ragging. According to the manufacturer, this material does not become tacky, and no sanding is required after application.

New Binks Spray Gun

The Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill., announces its new Thor Model 2 spray gun which replaces the Binks No. 205 gun. The new Thor Model 2 does away with nozzle regulation of the spray gun. A variable spray is produced by a simple turn of the screw control on the back of the gun without stopping spraying operations. This spray regulation is away from the gun head and located conveniently near the material regulation control. The air nozzle is self-aligning and requires no adjustment; its relation to the fluid tip never changes; the atomizing efficiency never varies with any size of round or flat spray.

The entire Thor gun is substantially constructed. The drop-forged body has a tensile strength of 62,000-lbs. per sq.in., yet the gun is light. The handle is die cast. The fluid nozzle is built of special stainless steel, and the needle valve stem of special hardened stainless alloy steel. The air nozzle is drop-forged bronze construction. The two-finger trigger has a light, straight pull. The air inlet through the handle balances the material hose, preventing down-

Self-aligning; no nozzle adjustments

pull at the head. The gun balances perfectly in the grip, allowing trigger fingers to move in freedom.

The Thor Model 2 comes in two types. Both models are identical except that on one the spray adjustment is made by a removable key and on the other by a stationary control.

Values do not exist in materials, they exist in the minds of the people who are going to buy.

BUTANOL

TIME tested, its merit proven by successful lacquer manufacturers everywhere, Butanol is the standard of value by which all other lacquer solvents are judged.

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Reco Mixer

The Reynolds Electric Co., 2650 W. Congress St., Chicago, Ill., announces to the trade the Reco mixer which is ideal for mixing finishing materials in factories where finishes are applied to the product.

The Reco mixer is of a convenient size, 55-in. high, 23-in. wide, 20-in. depth, and occupies

Employs planetary principle of mixing, thereby assuring thorough mixing of every portion of the material.

24x24-in. floor space. It operates at only two speeds, high and low, which are changeable by an easily operated lever. High speed is used for whipping or beating; low for mixing or stirring. It has a 22-qt. mixing bowl suspended in yoke, held securely in place. A simple lever raises or lowers the bowl while a clamp screw locks the yoke in any position.

It employs the planetary principle of mixing. This action closely resembles that of the human arm and wrist and assures thorough mixing of every portion of the material. The illustration shows the planetary arm, which revolves in the same direction as the beaters themselves. Consequently it reaches every portion of the mixture, folding, cutting through, and beating every portion.

The general construction of this Reco mixer is substantial and durable. Gears are machine cut and accurately fitted. All parts subject to strains are reinforced and only the best materials are used. Bearings have convenient oilers. Finish is light gray and baked on.

A ¼-h.p. Reynolds electric motor with liberal overload capacity operates this mixer. The motor is furnished with a 10-ft. cord and attachment plug and may be connected to any outlet.

Twin-Tunnel Drying Machine

The Metalwash low heat, continuous drying machine has been perfected to take care of work coming from cold or hot rinse tanks, requiring quick drying of miscellaneous metal parts, replacing sawdust drying. It is a relatively small compact unit, arranged in two drying chambers for either hot or combination cold and hot-blast drying.

The overhead, single chain, return conveyor, which is mounted on top of the blast chambers, carries the work through the blast tunnels, entering at the left and returning at the right to the same operator.

The dictionary says: "TRIUMPH: To gain a victory. Achieve success. To prevail."

LINGERWETT REMOVER

has *triumphed* over all others

Greatest in performance - Greatest in sales

Most paint and varnish removers *seem* alike. They look alike and they smell pretty much the same. And most of them act just about the same on the job.

Most of them do—but not all. There are a few popular brands that are better than the rest and they have, of course, built up a larger sale. But head and shoulders above them all in sales towers LINGERWETT—the largest selling remover in America. For LINGERWETT has achieved a Triumph founded upon definitely superior performance—not just a little better performance, but *definitely* better performance.

LINGERWETT is a different remover—different formula, different method in the making, and it gives different results in use. It would take a solid page to tell you just how and why LINGERWETT does a better job in every kind of removing of paint, varnish, enamel, shellac, or lacquer.

The simplest way to learn of LINGERWETT'S superiority is to get a can and put it to work on your next job. If you want a free trial can, here's the coupon right below. Either send it, or go out and get a full size can, but learn about LINGERWETT *now*. It will pay you in labor, time, and money saved, to say nothing of the far greater satisfaction of using so fine a product.

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The tunnels are formed by U-shaped blast chambers containing steam radiating fin coils. An exhauster of suitable capacity creates a certain pressure in the blast chambers, which forces the hot air through patented adjustable nozzles against the passing work, thus blowing off the water globules by mechanical force while at the same time the heat absorbs the remaining moisture. In order to eliminate water spots as much as

"Metal parts can be handled immediately after leaving the dryer."

possible on highly polished material, the heat in the left chamber may be shut off to prevent actual drying, but permitting the cold blast to drive off all excess liquid until the work has reached the heated return tunnel, where the remaining moisture is evaporated.

The conveying chain travels on rollers on tracks and is connected to a speed reduction drive.

This dryer is a product of the Metalwash Machinery Co., Inc., 117 East 24th St., New York City.

Staining Slender Mouldings

A device that we use to expedite the finishing of mouldings is illustrated herewith. After the mouldings have been sponged (usually several at a time, if small) and sanded, they are ready for staining. The staining box consists of a waterproof box into which has been inserted a bent pipe. The part of the pipe inside of the box is perforated to allow the stain to enter.

Mouldings are pushed in at one end of the box and pulled out at the other end, usually between a

A bent pipe extends through stain tank.

handful of waste to wipe off the excess stain. A surprisingly large number of mouldings may be stained per hour in this manner. We find this method much quicker than brushing the stain on, and much more economical in the use of material than spraying.

In some instances we have filled the mouldings in the same manner with fair success; but filling, for best results, really requires some method whereby the filler is worked into the pores of the wood.—M. M. M.

New Circular Features Paint Masks

A new circular prepared for distribution by the Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa., features M-S-A Half Masks, paint respirator type, which assures protection against poisonous and injurious gases and fumes encountered in paint spraying —such as benzol, amyl acetate, etc.

Metal Finishing Department

Cleaning-Handling Baking & Polishing

How Conveyors Reduced Finishing Costs

Vice President of Lyon Metal Products, Inc., Aurora, Ill., collaborating with A. C. Nielsen Co.,* engineers, gives facts and figures on reduction of handling costs in finishing department through the use of conveyors

By C. E. GERHERICH

IT IS DIFFICULT to figure the complete savings that accrue from the use of a flexible conveyor system adapted to the particular manufactured product. Of course the actual saving in wages is easily obtained, but the greater productivity of the department as a whole and the ease of operation effected by conveyors are not readily calculated. Hence the figures given herewith apply only to the savings in wages; to appreciate the intangible benefits one must read between the lines.

Our product, which consists of steel lockers, steel shelving and metal furniture as well as other metal products, lends itself readily to overhead conveyorization. We employ both spraying and dipping methods for the application of enamel and operate nine baking ovens in connection with these operations. One main conveyor track extends from the metal-cleaning department through the entire finishing room to the assembly and shipping departments on the floor below.

From this main track, branch conveyor lines lead to spray booths, dipping tracks

*Nielsen Certified Performance Surveys, 4450 Ravenswood Ave., Chicago, Ill.

and ovens. By means of switches, racks loaded with parts may be diverted to the desired point for finishing and, upon completion, they are returned to the main line to be delivered either in the assembly or shipping departments. These conveniently located switches produce maximum flexibility of the system and overcome one of the strongest objections to fixed conveyors in finishing rooms where more than one method of finishing is employed.

What We Used Previously

Before installing this present conveying system, we used short trolley conveyors through the ovens and on some of the production lines. Unfinished parts were trucked to these individual production lines, and then hung on the conveyor which carried them through the ovens, or to spray booths or dip tanks. Upon completion of the finishing operation or baking, parts were lifted off the conveyor and loaded into truck skids for delivery to the assembly or shipping departments.

Naturally, through excessive manual handling of parts, costs were high and production in the finishing room was curtailed to the point that it was necessary to operate this department overtime to accommodate the normal production of the remainder of the plant. As in most cases of manual handling, the flow of parts through the finishing room was spasmodic and utterly lacking in those elements that make for economy.

With the advent of the present mechanical handling system, three hand dippers have been eliminated by the installation of an automatic dipping arrangement of the conveyor. All loaders and unloaders at the baking ovens have been dispensed with, since this conveyor system carries freshly enameled parts into the ovens and out again.

Perhaps the most notable saving in point of actual wages saved, ease of operation and a more rapid and uniform flow of work, has been in the spray finishing of small parts. Formerly these parts were unloaded from trucks, placed in the spray booths and, after the application of enamel, then loaded in racks to be run in the baking ovens. Following the baking period, parts were again handled from the racks into trucks for delivery in assembly or shipping departments.

Through the aid of the present system with right angle switches, racks loaded with parts are run into the booth for spraying and are then carried into the ovens to be baked. Upon completion, these loaded racks are again switched back onto the main conveyor line. Seven operators now handle the enameling and baking, eliminating four helpers which were necessary with the former method of handling parts.

What Savings We Made

Since installing this equipment a total of 15 material handlers and helpers have been eliminated. Basing our calculations on a year of 300 working days of eight hours

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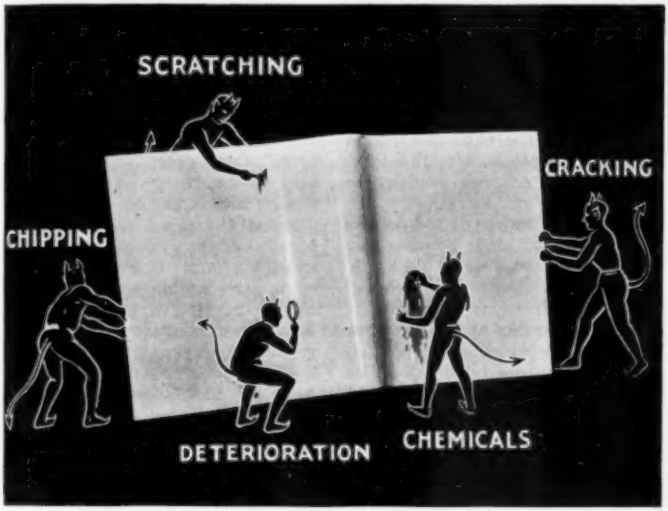
Of Air Heaters
NICHOLS PRODUCTS
CORPORATION
12933 Greeley Ave., Detroit
122 East 42nd Street New York
DIVISION OF ROSS INDUSTRIES CORP.

WITH THE RIGHT FINISH, YOU'LL FINISH RIGHT



Lilly's Synthetic Enamel

A new finish for metal and metal furniture combining unusual smoothness, toughness, elasticity and durability. It offers a remarkable resistance to scratching, chipping and cracking; to acids and other chemicals; and to internal chemical deterioration. While the figures in the illustration are drawn of course, the enamel baked on the sheet-iron sample is reproduced just as it photographed after repeated bendings and scratchings. After proper baking, the chemical elements in this enamel are held inactive. Deterioration is virtually suspended. The result is a most satisfying durability.

Will tell you all about Lilly's Synthetic Enamel on Request. Write to either office.

LILLY VARNISH COMPANY

666 S. California St. Indianapolis, Ind.
273 N. California Ave. Chicago, Ill.

Lilly Quality is available in Lacquers, Enamels, Fillers, Stains and Varnishes. Write us about your present or future requirements in the industrial field.

LILLY

each, at a rate of 60c per hour per man, a yearly gross saving of $21,000 is effected.

The initial cost of 2,370-ft. of conveyor was $10,700 plus $1,600 installation charges making a total investment of $12,300.

Basing depreciation on 20 years useful life of the equipment, plus average interest at 6%, the total annual fixed charges amount to $1,002.45.

The cost of power of 35-k.w. per hour, operating eight hours a day for 300 days gives us 84,000-k.w.h. at 3c per k.w.h., or a yearly cost of $2,520. Figuring maintenance at five hours per day at 60c per hour for 300 days gives us a cost of $900. Estimating lubrication and parts for one year at $100, and adding all of these costs to the annual fixed charges produces a total yearly operating cost of $4,522.45.

After deducting the yearly operating cost from the actual gross yearly saving, we have a net saving of $17,077.55 per year. Thus it may be seen that the original investment has been returned in nine months operation. As I have said before, these savings may be easily measured in dollars and elapsed time, but the intangible benefits of the system immediately available and those which are cumulative can only be determined by the results represented in reduced operating costs on the same volume of work, and the ability to handle larger production more efficiently and more economically.

Cleaning Before Finishing

By
*C. H. MacGIRR**

How to use various cleaning solutions and after rinses effectively so that the metal surfaces will be thoroughly cleaned, rapidly and economically, before finishing operations begin

THE cleaning of metal parts preparatory to the application of finishes plays an important part in a wide variety of industries. Thus, before painting, enameling, japanning, and lacquering, it is of the greatest importance that the metal be free from every trace of oil, grease or other foreign substances which will prevent good bonding between the finish and the work itself.

Unless the correct type of cleaner be employed and the cleaning operation itself carried out in correctly selected equipment which will provide adequate agitation, etc., there is a grave risk that the finish will be patchy, or, in extreme cases peel or flake from the work.

There are two general methods of cleaning parts which are to be japanned, painted, enameled or lacquered, namely (1) cleaning in open tanks, and (2) cleaning in automatic cleaning machines.

If the parts are cleaned in open tanks, the cleaning solution should be kept as near the boiling point as possible by the use of steam coils. These heating coils should be installed along the front side of the tank—that is, the side nearest the operator, so that the convection current will carry the

* Member of Research Staff, E. F. Houghton & Co., Philadelphia, Pa.

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When used with other lacquer ingredients Rezyls are entirely compatible with them. Rezyls are readily soluble. They reduce nitrocellulose requirements. Formulating with Rezyls adds durability to the coating and tends to cut its cost.

We have published a booklet which includes much of our experience with Rezyls in different fields of use and the results of our exhaustive tests on different formulas. This interesting booklet will be sent upon request.

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grease and scum on the top of the solution away from the operator, and thereby enable him to remove the work through a clean solution. Live steam should never be turned directly into the solution for heating purposes, as the condensation of the steam dilutes the mixture and one can never be sure of its exact concentration.

The time of cleaning can be greatly reduced by agitating the solution around the part. This can be easily accomplished by the use of an air line which can be run down inside one corner of the tank and then across one side about 6-in. above the bottom of the tank. This air line should be made of ½-in. pipe and 1/32-in. holes drilled about 2-in. apart. The holes should be very small, as indicated, as large holes allow all the air to escape at the end nearest the air supply and there will not be thorough agitation entirely across the tank.

Another very simple and efficient method of agitating the solution is by the use of a baffle plate placed in front of the heating coils. This plate can be made of thin sheet metal (See Fig. 1) and mounted in front of the heating coils, extending about two-thirds of the way down the tank. The plate serves to trap the heat of the steam coils behind it. Holes are drilled in the plate about 6-in. below the water line. These holes can be from ½-in. to 1½-in. in diameter, depending upon the size of the tank, and should be not more than 6-in. apart. The solution back of the baffle plate is rapidly heated by the steam coils and flows out through these holes with considerable force, thus giving motion to the entire tank of solution.

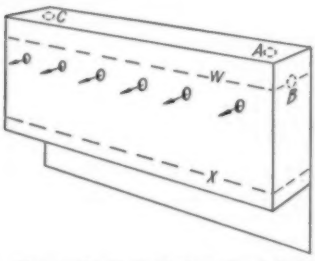

Fig. 1—Drawing of sheet metal baffle or box placed over heating coils to agitate the cleaning solution. The holes A, B or C are for steam pipes to enclose heating coils; bottom of box is open. Dotted line W represents bottom line of heating coils. The holes where arrows appear are ½ to 1½-in. in diameter and spaced 5 to 6-in. apart.

Requirements of Cleaner

The cleaner should be of such a nature that it will readily emulsify all types of oils, and at the same time should be low in caustic content. A cleaner which is high in caustic content, as many of the cheap cleaners are, will give a great deal of trouble in rinsing. The excess of free alkali in such cleaners is liable to cause alkali stains on the work.

Cleaners which are made up entirely of alkalies or caustics are not able to emulsify, and, hence, will not remove oils which can only be removed by emulsification. The ideal cleaner for this type of work is one which combines emulsifying and saponifying agents. Such a cleaner will quickly remove all the oils and soaps commonly found on stamped work, and will rinse off readily, leaving a chemically clean surface.

The work should be rinsed in clear water which is kept as near the boiling point as possible. The hotter the rinse, the quicker the work will dry. It will be found very advantageous to use two

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A clear lacquer for outdoor use . . . proof against the actinic rays of the sun!

YOU'VE heard of "outdoor" lacquers before. But not from Egyptian. A true outdoor lacquer, in our estimation, should remain clear and *preserve the original color of the metal beneath* in direct daily sunlight.

After years of test and experiment we've perfected this lacquer. It's called "Actino"* a registered name, obtainable only in the genuine Egyptian material. Use it on a ruddy copper store front, for instance, and you'll have a brand new experience. That copper won't darken! Actino* is going to be used extensively for that reason on exterior metal work of all kinds — lamps, signs, casings, doors.

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*Reg. U. S. Pat. Off.

rinse tanks, so that the work can be rinsed practically clean in the first tank and then dipped in a second clean rinse. It is then more likely to come out thoroughly and chemically clean than if only one rinse tank is used. In using only one rinse tank, any alkali carried over is liable to leave stains on the work. In any event, the rinse water should be dumped frequently, as one cannot expect a clean surface on work which is rinsed in dirty water.

Continuous Cleaning Machine

Where a large production is available, it will be found more efficient to clean in continuous cleaning machines rather than in open tanks. In these machines the work is carried through at a steady rate on conveyors and is cleaned by a spray of cleaning solution of very mild strength. With an efficient cleaner not more than 1/3 to ½-oz. per gallon of water should be necessary. This means that in a 100-gallon system not over 3-lbs. of cleaner should be necessary for the first make-up. If the work is very dirty, this mixture should be thrown away each day and a fresh mixture made up. If the work is fairly clean, about a pound of cleaner can be added to the system each day for upkeep, and the solution will need to be dumped only about once a week. The solution can be heated in the tank below the work by the injection of live steam, as this serves to create a slight overflow in the tank and flow out all the oil and scum from the top of the solution. The solution should be applied to the parts at a fairly high-pressure —40 to 50-lbs. per square inch—as this pressure helps to loosen the caked-on dirt and shorten the time of cleaning.

Eliminating Alkali Stains

On continuous cleaning machines it is highly important that a cleaner be used which will remove all the different types of foreign matter from the parts *in the least possible time*. The parts go through the cleaning compartment on a continuous conveyor and have only a limited time in which to be cleaned.

After cleaning, the work is carried on through a rinsing compartment in which clear water at as nearly boiling temperature as possible is sprayed on the work. Thus the hot work dries very quickly.

It is well known that alkali stains on the work will cause a great deal of trouble in getting an even coating of japan or enamel.

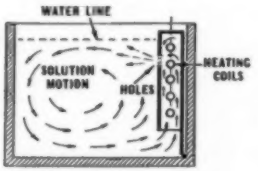

Fig. 2—Diagram showing agitation of cleaning solution as produced by use of the baffle arrangement over heating coils in tank.

It is not so well known that water stains may also cause no end of trouble. These water stains are usually due to the hardness of the water in the rinse. This hard water evaporates on the work in drying and deposits white spots which will prevent the adhesion of any finishing material. This trouble can be eliminated in a continuous cleaning machine by the use of an air spray between the rinsing operation and drying oven. This air spray forces all water off the work very rapidly and does not allow the salts in the drops of water to settle on the work.

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SOLFO is a metallic coating put on like paint. It seals the pores of galvanized surfaces, prevents peeling and oxydizing, is easy to apply and will not deteriorate. It is colorless, odorless, non-inflammable and non-poisonous.

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"Superior Super-Metal"
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Manufacturers of: Black, Galvanized, Long-Terne and Special Coated Sheets, Roofing and Kindred Products; Billets, Rods, Wire, Nails and all types of Fence. (133)

Where water stains give trouble and it is not practical to remove the water quickly by the use of an air spray, the trouble may be overcome by softening water with borax or similar water softener in just sufficient quantities to counteract the hardness of the water.

The "Water Break" Test

A very good test by which the action of the cleaning solution can be carefully checked from time to time is known as the "water break" test. This consists of taking a part after rinsing and dipping it in cold water. The water should immediately run off the work in a sheet when the work is withdrawn. If the water adheres to the work in spots, or "breaks" in spots, it clearly indicates that the surface of the work is not chemically clean. It is good practice to use this test three or four times a day, as a few minutes spent in testing the action of your cleaner may save a great many complaints which would come in months later when the finish applied to the work begins to peel. In using lacquer it is particularly necessary to have an absolutely chemically clean surface for the lacquer to adhere to. In japanning, the thinner used may take up some of the oil or other matter left on the surface of the work, so it is not so imperative that the work be chemically clean.

Removing Rust Spots

If a light coating of rust or rust spots are present on the work, this will not be removed by the cleaner. It is then necessary to use dioxidine, or some similar product which can be applied with a rag after the cleaning operation.

Where it is desired to protect the work from rust for a short period of time the addition of about a pound of soap to 80 to 100-gallons of rinse water will leave an almost imperceptible coating on the work which will protect it from rust for a short time. It is important that the soap used be a neutral soap and not contain any free caustics. —*Black & White.*

Refinishing Automobiles

There was a time when the painting of automobiles involved the removal of all old finish down to the metal, and then the building up of a new finish step by step.

Automobile finishes, as they are applied today in the up-to-date production factories, include undercoats which are likely to last as long as the automobile. This, of course, means that after about the second year, when most automobiles begin to look shabby, a new coat will make the car entirely presentable.

One of the principle aids in the refinishing of automobiles is the use of waterproof sandpaper to prepare the surface.—M. J.

Changing industry demands new and advanced equipment to meet and hasten developments in manufactured product.

Opens Warehouses in California

The Magnuson Products Corp., of Brooklyn, N. Y., announces the opening of warehouses in San Francisco and Oakland, Calif., in addition to the eight others already established in principal cities of the U. S. and Canada.

Gas Fired Unit Heater Folder

The Nichols Products Corp., 12953 Greeley Ave., Detroit, Mich., has ready for distribution an illustrated, descriptive folder about the Nichols Gas Fired Unit Type Air Heater, and will gladly place interested parties on the mailing list to receive copies of Nichols folders.

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The paint manufacturer's closest approach to a porcelain finish in enamel.

Has unusual adhesion — hardness of baked finish — high gloss or dull — quick bake. High solids give exceptional build and toughness without brittleness.

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•DRY AIR for Spraying

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Moisture in the airline has long been a sore spot in every finishing room.

The Eureka Type "E" separator is guaranteed to remove all moisture from the air line in the most extreme cases.

Moisture carries oil from the compressor through the line to the sprayer and on the work, causing imperfect and spoiled finishes.

Write for catalogue showing this and other new Eureka developments.

Eureka Pneumatic Spray Co.

Note: New Address 128 White St., N. Y. C.

Questions and Answers

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer any further comments or recommendations pertinent to subjects mentioned

Finishes for Baseball Bats

We are wondering if you can tell us some of the best finishes for baseball bats.—L. Mfg. Co.

In finishing baseball bats, a finish is required that is durable, economical, and which provides a real protective coating. One of our customers, after exhaustive tests, found that the best method of finishing bats was through the application of shellac.

For the clear finish on the baseball bats, one, two, or possibly three coats of shellac are applied. The bat is then buffed to bring out the high gloss that is natural to shellac. However, where a colored finish is desired, the addition of aniline dyes mixed in alcohol provides a finish that is beautiful and satisfactory from the standpoint of durability.

However, as you know, there are a number of shellacs on the market—sub shellac, synthetic shellac, and strictly pure shellac. The strictly pure shellac is the product we recommend.—James B. Day & Co.

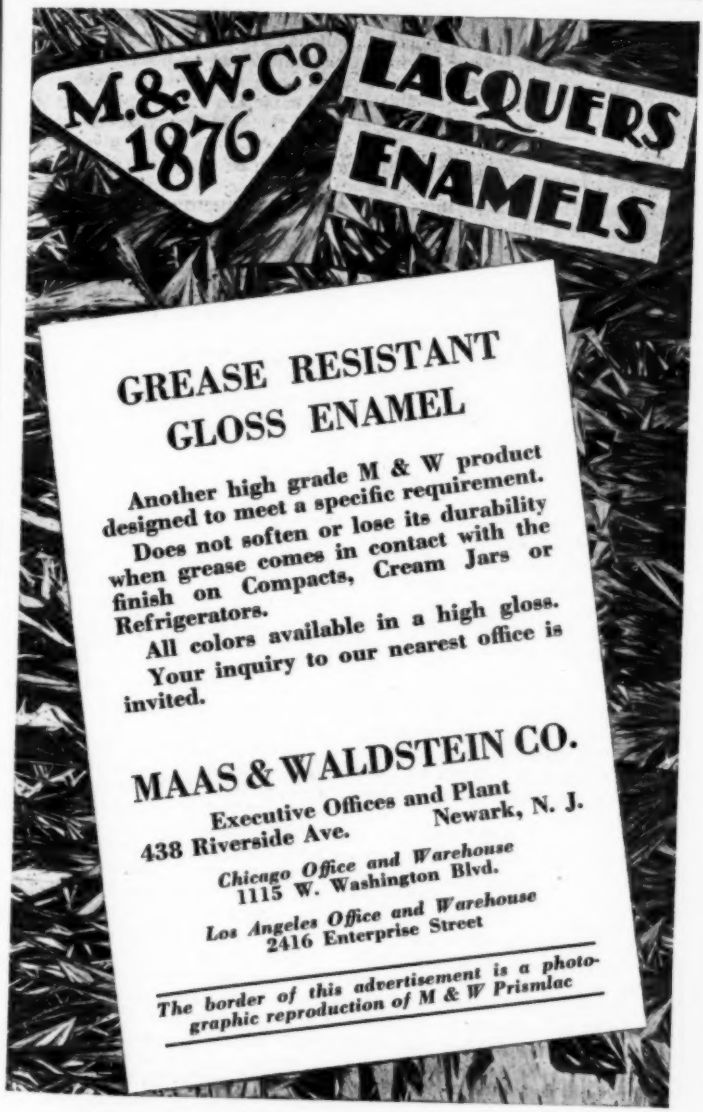
One of the best methods of finishing baseball bats that has come to my attention is as follows:

After the bats have been sanded, and while they are still in motion in the lathe, apply a combination stain-fill of the desired color with a pad. Rub this stain-fill into the pores of the wood, and wipe off. Remove bats from the lathe and allow to dry thoroughly by placing in a vertical position in a rack, holding the bats in position at the top and bottom by sharp pointed metal pins, so that the bats are not in contact at any point with the wood frame of the rack.

When the stain-fill is thoroughly dry, dip the entire rack of bats into a tank containing shellac; then allow the bats to drain and dry. When dry, remove the bats from the rack, place in the lathe again, and polish or rub while in motion. The rubbing medium used depends upon the results desired. Some manufacturers use a steel wool pad of very fine grade; others use a slightly abrasive compound.

The size of the dip tank, holding rack, and the method of handling the bats around the finishing room will depend upon the volume of production. Some of the large manufacturers use conveyor systems and racks which accommodate from 200 to 500 bats.

I mention shellac as a finishing material because it produces an acceptable finish and, at present prices, it is economical. Dipping lacquer could be used, perhaps with equally good results, but the cost will be greater than white shellac. Dipping varnish could also be used, but even with forced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Does not soften or lose its durability when grease comes in contact with the finish on Compacts, Cream Jars or Refrigerators.
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The border of this advertisement is a photographic reproduction of M & W Prismlac

drying facilities the production schedule would have to be lengthened, due to the longer drying period necessary for this material.—P.C.B.

Urushi Lacquer on Metal

Recently there came into our lacquer room a cigarette case and lighter made in Japan. There was a wonderful finish on the surfaces—black with decoration on both sides of the case and lighter. I was enchanted with the lovely sheen of black. It was simply perfect—no rubbed nor polished work anywhere, no orange peel—a perfect mirror surface with a depth that I certainly envy.

Under the black surface in one place I could see a deep red, like a wine red, used probably as a primer or first coater. On the front of the case was a large flower bowl—probably 2-in. wide, and pink with a red cast—a large red rose about 1-in. wide, and olive green leaves, among which were small opaque red flowers. The bowl was outlined with gold bronze and decorated in small half moons across and lengthwise of the bowl—a long stroke every ¼-in. The outline of the rose and petals were gold bronze, and the veins of the leaves were raised gold bronze.

On the back of the case was a spray with a flower at the end like a white lily. Near the edge was an oriental monogram—whether Japanese or Chinese, I don't know. In the top corner was a gold paillon butterfly with two blue stines.

On the lighter the decoration was just a little different, and this is one of my reasons for thinking it was hand work, but the chief thing I noticed was that the gold bronze on the stalk of the spray and one other place was slightly polished away, and right there was what appeared to be a silver deposit; one ran into the other and then came the perfect place again where the gold bronze covered the silver. This is what gives the gold bronze that raised effect. Also, on close inspection the leaves are slightly roughened and filled with little particles of gold bronze powder as though they had come off the brush. The flower, like the lily I mentioned previously, was also like silver deposit work.

Now, I would like to know whether or not the material on this case is the Japanese lacquer called urushi, and how the decoration was applied.—J. J.

The cigarette case and lighter were probably finished in real urushi lacquer. The Makie work (designs and pictures) was also of urushi in colors, applied by hand with a brush, even to the finest and thinnest line or spot.

When rose urushi is heated until it bubbles, it becomes very elastic and flows from a brush very smoothly and does not dry too fast.

No bronze powder is used, except on inexpensive articles. Gold dust, powder, leaf and fritters are ordinary for this class of work.

The bottom sheen which pleased you so much was obtained by hand rubbing probably many times after Makie work was finished. This is done by applying Sesime or kiurushi over the entire surface, and wiping it off as well as possible, leaving only the trace of urushi, then baking in a mild oven for a minute or so, and finally rubbing with oil and fine powder.

If the rubbing urushi is allowed to dry completely, the polish will

#1900 WATEROIL RUBBING OIL

Gives you the same effect as a water rub without any of its difficulties. Eliminates haze or bluish bloom—no greasy finger marked surfaces—it is clean and clear and remains that way.

BLEACHING SEALER

Briefly—it is a *Non Grain Raising Wash Coat Sealer* for end wood, turnings, or for soft woods, to *keep stain* or *filler from taking dark* or *uneven*. Also for overlays—light margins or panels. May be brushed or sprayed and requires *absolutely no* sanding as it does not raise the grain.

SUPER BLEACH

An entirely new and greatly improved bleach—many times more powerful than any previously offered.

WATEROIL LACQUER STAIN

Brand new and designed for *Spray-Staining* and *Sealing In One Operation*. It saves one Sealer Coat.

ORDER NOW!

Ask us about these or any other new products in
"Unquestionable Quality"
WOOD FINISHING SUPPLIES

V. J. DOLAN & COMPANY, INC.

1830 N. Laramie Ave. Chicago, Ill.

GOOD NEWS!

A New Lacquer Drawer Coater

FINISHING executives will welcome this new Lacquer Drawer Coater—just introduced by the Jamestown Wood Finishing Co. It is the result of a long period of careful research by our chemists and has been thoroughly tested in actual use with amazing results.

Here are just a few of its features:

1 Quick drying.
2 Good stick out or full body.
3 Sheen medium to flat.
4 Non-grain raising.
5 Good sealing.
6 Excellent flowing.
7 Replaces shellac and wax.
8 No residual odor.
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JAMESTOWN WOOD FINISHING CO.

PLANT AND EXECUTIVE OFFICES, JAMESTOWN, N. Y.

become scratchy. On the other hand if it is not allowed to dry sufficiently, it will not be shiny and bright. Long experience is required to really do this work well.

The process is repeated from one or two to several times, according to the grade of work one wishes to turn out.

The spray effect is obtained by sprinkling pigments or gold powder from a knife or from a tiny sieve onto the surface while it is still wet, and dusting off after it is dry. The raised parts are coated two or three times with a mixture of urushi and pigments, or earth powder, as the case may be.

To test urushi finish, drop alcohol, acid, or alkali onto the surface. If the chemical doesn't affect the finish, it is urushi. However, I do not recommend this method of testing unless you know what to do in case the surface is affected by the chemical, for many articles on the market are elegant looking and are known as Japanese lacquer work, but they really are done in shellac and mastic etc., and polished with oils and wax, which gives an appearance and feeling similar to urushi to those who are not experienced with urushi finishes.

To Clean Dipping Fixtures

What is the best method of cleaning fixtures that are used for dipping small turnings in lacquer and enamel? We now use steel rolls to grind it off the pins which are anchored into a wooden base. —J.W.P.

There are several methods in use today for cleaning dipping fixtures, but in my opinion, one of the best plans is as follows: Mount a steel drum, either vertically or horizontally, between centers and equip this drum with a small pulley and motor drive. I believe the vertical mounting will be best suited to your purpose. The end of the drum should be removable, so that the fixtures may be inserted in the drum from the end. In placing the fixtures in the drum, they should be fitted fairly tight, as this operation is essentially not a tumbling operation.

After the fixtures are in the drum, fill the drum half full of the proper solvent for the material adhering to the fixtures. Then rotate the drum long enough to wash the caked material from the fixtures. It may be necessary to mount the drum slightly off center to obtain an eccentric motion which will splash the solvent over the fixtures.

If the number of fixtures to be cleaned prohibit the use of drums, it may be advisable to install a large circular vat (with suitable cover) having a false bottom which rotates with a half-circle motion similar to that of electric washing machines* commonly used in the home. The fixtures should be placed on this rotating false bottom, which will drag them to and fro through the solvent. Of course, such an installation would be more expensive both in initial cost and in operation than several drums.

The time necessary to clean the fixtures thoroughly will naturally depend upon the amount of finishing material on the fixtures and the length of time between cleanings. If the cleaning is done weekly, it is possible to run the equipment over Saturday after-

*Name of manufacturers of metal cleaning machines will be given on request.

noon and Sunday, thereby obtaining a 42-hour period, without interrupting production.

In this method of solvent cleaning, the lacquer or enamel adhering to the fixtures may be salvaged for use in second grade parts, or for semi-exposed or concealed work. With the proper treatment by an experienced finishing material manufacturer this reclaimed material could be used in your regular run of work.

A large plant producing baseball bats coats the dipping fixtures with a thin application of cup grease. This enables the finishing material to be easily and quickly scraped off the fixtures. These scrapings are returned to the finishing material manufacturer who reclaims the material for a nominal cost to the baseball bat company.

Any method whereby it is possible to salvage the original material, in my opinion, is far better than a method designed merely to clean and in which the original material is destroyed.

However, if you do not wish to salvage the original finishing material, and if you can change the fixtures to all metal instead of a combination of wood and metal, there are two methods of cleaning. First, by burning the caked material in a furnace equipped with either gas or oil burners. The other is a hot lye or caustic soda bath which will slowly eat the material from the fixtures.

Of course it is self evident that if either of these methods is used, it is necessary to have all metal fixtures; and if caustic soda is used the metal must be free of any aluminum, as the soda will attack this metal.

If the solvent cleaning method

EVER since spray-finishing became an accepted industrial accomplishment, men in the "know" have held "white" to be the standard stickler for all lacquer manufacturers. After two years of commercial testing, we came out with our standardized *Flexible* Blue Knight BLAX. It went over in bang-up style. Recently, we told BLAX-*users* that we had demonstrated, by *continual* testing, that our newest *Flexible* Blue Knight WYTES had everything on the ball that BLAX had. They didn't believe it could be done. Now, *Flexible* Blue Knight WYTES is proving all our claims.

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You may be skeptical too, and we don't blame you. Write, then, for testing strips showing *single* cross-coat sprayings of *Flexible* Blue Knight WYTES on clean metal (*aluminum, brass and hot or cold rolled steel*). No primers . . . . . no bake! Coverage! Adhesion, which you can prove yourself by twisting, fingernailing and abusing the strips we'll gladly send. FLEXIBILITY . . . . . that offers the best insurance against chipping and flaking, and permits stamping and forming where necessary.

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For Finishing

Wood
Metal
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Composition

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Write for Sample Panel

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is used, it will afford you no advantage to grease the fixtures before using them, as the action of the solvent is to gradually soften and dissolve the caked material.—C.J.L.

Drain Board Coating

We finish all our steel equipment such as shelving, cabinets, etc., by the dipping method in regular air-dry enamel, and find that after we dip the material, the excess paint runs onto the dripping board and sticks to it, where it accumulates a great deal of dust and other dirt before it rolls back into the paint tank.

This drip board is made of wooden skeleton covered with a thin gauge sheet steel and is inclined at an angle of 15°. This angle cannot be made any steeper as we do not have the head room; we realize that if the drip board is inclined at a sharper angle it would help our problem considerably; but we have to rely solely on some coating—either a paraffin or a soapy substance that the paint cannot stick to. We are wondering whether there isn't some soapy substance or coating that could be applied over the dripping board to prevent the paint from sticking to it and to permit the paint to roll back easily and quickly into the paint tank.—U. F. Corp.

I suggest you coat the drip board with a high test cocoa-butter. It has been found by actual test that cocoa-butter is superior to paraffin and any of the oils for this purpose. Cocoa-butter is not injurious to finishing materials. This is an important feature because some of the coating material will drain into the dip tank. The purer the cocoa-butter; the higher the

melting point. A high melting point is desirable, especially during the hot months.—C. B.

Seal Mahogany Oil Stain

We have some oil-stained mahogany finished articles which we want to refinish in aluminum lacquer. A sealing coat must be put on to keep the mahogany stain from bleeding through. Can you furnish me the name and address of a manufacturer of a material that seals up stain (oil) and permits a new finish to be applied.—C. Mfg. Co.

Your problem is a very difficult one, as oil-soluble mahogany stain bleeds very readily into almost any kind of a sealer or top coat. We have seen instances where wood which was stained with an oil-soluble mahogany dye was sanded so that it appeared perfectly white and then given a coat of white lacquer, only to have a very noticeable pink cast appear.

If the stain which you have used does not bleed too severely, the following method may solve your difficulty:

First sand the wood thoroughly to remove as much of the surface stain as possible; then apply a very thin coat of shellac—about a 4-lb. cut reduced with equal parts of alcohol, and sprayed lightly. Allow this to dry overnight, and if necessary apply a second thin coat of the same shellac. The idea of the two thin coats rather than one heavy coat is to permit the shellac to dry before bleeding takes place. Shellac is just about the best sealer for this purpose that we could recommend.

The aluminum lacquer should be applied over the thoroughly dry shellac.—The Glidden Co.

Nigrosine as a Pigment

This dye is largely used to enrich some of the less brilliant black pigments. It has a distinctive bluish tinge in dilute solution. Since it is only dye, it does not impair the gloss and therefore finds a use in the manufacture of gloss black enamels. Some of the cheaper grades are not fast to light, and the finisher should know that all grades of it are likely to bleed when a clear nitrocellulose lacquer is applied over them.—W. J. M.

DeVilbiss President Returns

Mr. Allen D. Gutchess, President of The DeVilbiss Co., Toledo, Ohio, has just returned from a business and pleasure trip to Europe. Mr. Gutchess sailed on the liner "Europa" on April 16 and returned on the "Leviathan" May 22.

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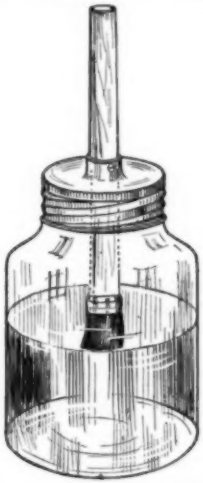
Clean Brush and Lacquer

A very practical little shop kink, where one has to do small amounts of hand brush lacquering such as light fixtures and other small intricate metal parts, is



shown in the accompanying sketch. Use a round-handle pencil-type brush and punch a hole in the screw top of a small glass jar as shown; then force the taper brush handle into it and make it secure with a small brad. This will give you a small receptical that will keep your brush and lacquer free of dust and dirt —at practically no cost.—C. H. Willey.

Coating of Glass

Different methods of coating have been tried on glass signs in order to produce *neon-like effects.* The object of this type of work is to brush a colored coating mixture on the lettering so that

the sign, when illuminated from the reverse side, produces a *neon-like light*.

The two important factors entering in this problem are the binder and the color. Let us discuss each factor separately and then combine our findings.

I have experimented with binders of various types. Gelatine was used first. I found that this binder was susceptible to temperature changes caused by the illuminating lamp. The gelatine coating becomes sticky when hot and tends toward brittleness when cold. Another fault that makes gelatine undesirable is that it has very little value as a color protective agent against heat and rays of the sun. After numerous experiments I found that French varnish gave the best results. It adheres well to the surface of the glass, is impervious to the heat variations and acts as a protection for the color, shielding it from the effects of the light.

Now let us turn to the color. When using gelatine, I employed water-soluble acid dyes as the coloring matter. Although these dyes have fairly good fastness to light, they failed to hold up for any considerable time due to the poor protection afforded to them by the binder. Finely-ground, lake toners were tried. They were found of very little advantage, as they obstructed the light rays sufficiently to spoil the *neon-like effect*. Color bases were then used in combination with the French varnish. These colors gave brilliant transparent light effects and had fairly good fastness to heat and light. This was due to the protection afforded the color by the binder. The color bases most commonly used in this type of work are. Rhodamine 6G base, Safranine base, and Chrysoidine

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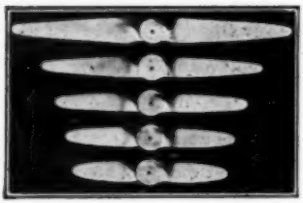

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Y base for the reds; Malachite green base and Victoria blue base for the blue.

The following formula was found most practical: Dissolve 4-lbs. of color with the aid of 1½-lbs. of glacial acetic acid in 12 gallons of denatured alcohol. Mix the aforementioned solution 1:1 with the French varnish. Brush on glass and dry at 140° F. in oven.

In conclusion, I hope the reader will find my findings clear and workable.—S. S. Harkavy.

Beautiful Grain of Wood; Finishing

In the finishing of interior woodwork or fixtures, of walnut or oak—for example, if you wish to apply a finish that is different—and one which will be pleasing to all who see it—you may omit the filling, etch the surface slightly with a sandblast, and then fume it by washing it with ammonia.

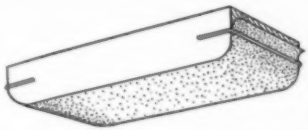
By using a first coat of sanding sealer and a second of brushing lacquer you can obtain a velvet flat finish which will be not only very easy to apply but exceptionally attractive. This woodwork will take on a natural beauty in marked contrast to that which is just varnished.—W. J. M.

Useful Sanding Block

In my visits to other plants I have noticed that many of the finishers still persist in tacking sandpaper on a block to rub down their work; others try to clamp it over a square-end block.

The simple little device we use in the shop to make our sanding blocks more useful is shown in the accompanying sketch. The

blocks are of straight grain hardwood and are fitted with stiff wire clamping clips—one at each end as shown—the ends of the block



Wire clamps hold sandpaper tightly in position.

being on a suitable radius. To remove and renew a strip of sandpaper is but a simple job, and the paper remains tightly clamped to the block while in service.—C.

The priming coat on new wood is designed to fill and seal the porous structure of the wood and furnish a firm and solid foundation for the body coat.

No lacquer finish for wood is absolutely waterproof. Even if it were, some moisture would enter the wood through the back and ends where complete sealing is impossible. The wood then swells and exerts ample force to crack any non-elastic finishing system.

The secret of a durable pyroxylin system for automotive woodwork is to see to it that each coat in the system, and especially the lacquer coat itself, has ample elasticity to withstand the normal expansion and contraction of the wood. It is also desirable to seal or prime the wood initially, both to make it more moistureproof and to saturate its surface with oil, thereby preventing it from absorbing oils and softening agents from the surfacing coats, which would cause them to become brittle rapidly.

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EDITORIAL

New Synthetic Resins

Probably the most important discovery since the development of low viscosity nitrocellulose lacquers is that covering a synthetic phenol resin which is described as being "oil-reactive." This is done to distinguish it from other synthetic resins as well as natural and ester gums which are *oil soluble.*

The new resin is easily soluble in tung oil in any desired proportion. It is said that there is a chemical reaction between the resin and the oil which may account for the accelerated hardening of the resin-oil mixture. This feature should be of especial interest to finishers since it provides a material radically different from similar varnishes now in use.

It is claimed that the flexibility, rapidity of drying, durability and toughness as well as resistance to moisture and alkalies are all improved due to the use of this new synthetic resin. Only a portion of the usual amount of metallic drier is required, therefore, the usual tendency of a varnish to continue to oxidize after application is greatly reduced.

It is interesting to note that this new synthetic resin may be used either alone or mixed with other synthetic or natural types of gums. In fact the addition of only 10% of the "oil reactive" gum to an ordinary varnish reduces the drying time to about one half.

The Colorscope

As its name indicates, the colorscope is a machine for scientifically matching colors which includes paints and lacquers. Professor Sheldon of New York University has done much to bring this process to the fore. His invention is based on the use of the photo-electric cell—another new development which resulted from research work in the radio field—to take the place of the human eye and transform the sensations created by the colored samples under investigation into electrical responses.

The colorscope has the power to differentiate light both as to color and intensity, and make the electrical needle of the instrument show the degree of difference. Thus it is possible to compare a glossy finishing material with one having a dull finish without the degree-of-sheen factor entering into the measurement. One might look upon this very much the same as a conversation between two men who understand each other perfectly except when a third party whom we may call

"Mr. Sheen" interrupts this agreeable conversation and makes it impossible for either of the two men conversing, or any one else, to arrive at any definite conclusions.

Samples about an inch in diameter are placed on the sphere which is a part of the machine, while inside this sphere are two powerful incandescent bulbs the purpose of which is to light up the samples for comparative purposes.

Lacquer Thinners

A surprising number of really large users of lacquers have the idea that thinner is thinner and any old thinner will do. The best thinning solvent for any lacquer is the one that will hold all solids in the lacquer, in solution.

Most lacquers are composed of several solids. A perfect solvent for one solid often times is not a perfect solvent for another solid. It is therefore necessary to use a combination of solvents to produce a thinner, or reducer, that will hold in solution all solids in a lacquer.

The nature and proportion of solids in a lacquer of one type will usually vary considerably from those used in a lacquer of different type. It follows, therefore, that it is quite improbable that a thinning solvent for one lacquer will be ideal for a lacquer of a different character.

The thinning solvent partially governs the viscosity of the lacquer. Inherent in the thinner, however, are the qualities which also govern the flowing properties of the lacquer, so that the wrong thinner may produce pebble or rough surfaces, while the proper thinner will cause the lacquer to flow out perfectly. Drying time may also be governed somewhat by the reducer.

DECALCOMANIA LACQUERS

The growing vogue for the new types of decalcomanias requires specialized undercoats and top coats.

For primers and surfacers of proper composition; for non-lifting top coats; for flexible finishes that permit forming the finishing article; for any requirement or difficulty in the application of the NEW decalcomanias, communicate with us.

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CHEMIST WANTED

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in or buy outright, varnish, shellac, lacquer and finishing materials manufacturing company doing about $100,000.00 annual sales. All information will be held in strict confidence. Address IF-391, care Industrial Finishing.

In choosing a lacquer or lacquer system, consider first the method of finishing suitable for the product to be finished, and second whether the product be of metal or wood.

Most manufacturers have a variety of stock thinners which they may safely recommend for various classes of work. There are times, however, where it is necessary to use a thinner especially constructed to meet the conditions.

One test for a thinning solvent is when extreme humidity is encountered. Unless the solvent has a correct balance, some of the solids may drop out of solution and show up on the work in the form of a blush. It is then necessary to use a thinner containing more of certain solvents which have greater resistance to blushing. Many times, high-boiling solvent, or retarder, may be added to the stock thinner and eliminate the trouble.

One lacquer manufacturer may formulate a material that will exactly meet certain requirements. Another lacquer manufacturer may formulate a material along vastly different lines, that will also exactly meet the requirement. Obviously, a perfect thinning solvent for one lacquer would not be entirely satisfactory for another.

Almost any one can buy a few drums of cheap solvent and make a mixture that has the odor and appearance of good lacquer solvent. There are many such materials now being offered at low prices. So far as price is concerned, there are two main things to consider—the purchasing power of the thinner manufacturer and his facilities for handling solvents. Lacquer solvents are highly volatile. If they are carelessly handled, there will be considerable waste which, of necessity, must reflect in the price of the finished product.

In buying and using lacquer thinning solvent, it is well to follow the recommendation of the lacquer manufacturer.